

‘Marsh Spot’ in Cranberry Bean Seed

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‘Marsh spot’ of cranberry bean seed is a brown discoloration of the flat inner surfaces of the cotyledons. Surprisingly, there appears to be no literature citations concerning the problem, despite the fact that serious economic losses have resulted from this non-pathogenic disease. Cranberry bean cultivars differ in their susceptibility to ‘marsh spot’.

The use of the term ‘marsh spot’ to describe the abnormality results from its resemblance to a similar cotyledonary problem in pea (*Pisum sativum* L.) (Glasscock and Wain, 1940), that is due to Mn deficiency. The term has been accepted within the bean industry, even though there is no evidence that Mn deficiency is the causal factor.

Four cranberry bean cultivars (Cardinal, ETNA, UI686, and ISB23) were grown at acid (Erie) and calcareous (Hatton) soil sites in North Dakota during 1998. Each cultivar treatment was replicated three times, and the treated plots were arranged in a randomized complete block design. Fifty seeds were taken from each harvested plot. The seeds were soaked for 60 minutes in deionized water, following which the interior flat cotyledonary surfaces were separated and examined for the abnormality. Two types of necrosis were observed. The primary problem was a central browning, the severity of which was ranked according to size. A secondary problem was a marginal darkening of the cotyledons near where the cotyledons were attached to the embryonic hypocotyl.

Data showing the incidence of the two types of abnormality in the four cultivars are given in Table 1. Cardinal was very susceptible to the problem while ETNA was little affected. UI686 and ISB23 were intermediate in their susceptibility to ‘marsh spot’. The problem was much more severe at the Erie (acid soil) site.

Whole seed Mn was relatively high (14-16 mg Mn kg⁻¹) in all four cultivars. In a follow-up greenhouse experiment we were unable to decrease the incidence of ‘marsh spot’ in seed of Cardinal by post-flowering, foliar applications of manganese sulfate. We have not excluded the possibility that either a deficiency of Ca or B was causing the problem.

Reference:

Glasscock, H. H. and R.L. Wain. 1940. J. Agric. Sci. 30:132-140.

Table 1. Percentage of seeds of four cultivars of cranberry beans grown at two sites affected with cotyledonary necrosis (‘marsh spot’).

Cultivar	Central necrosis [†]					Marginal necrosis [†]		
	a	b	c	d	a+b+c+d	e	f	e

Table 1. Percentage of seeds of four cultivars of cranberry beans grown at two sites affected with cotyledonary necrosis ('marsh spot').

Cultivar	Central necrosis [†]					Marginal necrosis [‡]			Both central and marginal necrosis
	a	b	c	d	a+b+c+d	e	f	e+f	
					%				
					<u>Erie</u>				
Cardinal	6.6	28.0	21.4	10.6	66.6	6.0	14.6	20.6	16.0
ETNA	0	0	1.4	2.0	3.4	0.6	9.4	10.0	0
UI686	0	2.6	4.6	18.0	25.2	7.4	5.4	12.8	2.6
ISB23	0.6	4.0	14.0	8.6	26.6	0	3.4	3.4	0
					<u>Hatton</u>				
Cardinal	3.4	5.4	13.4	14.6	36.8	22.6	24.0	46.6	18.6
ETNA	0	0	0	0	0	4.0	34.0	7.4	0
UI686	0.6	1.4	0	4.6	6.6	2.6	0.6	3.2	3.4
ISB23	0	0.6	0	2.0	2.6	0.6	1.4	2.0	0

[†] a,b,c and d indicate that width of the central necrotic area on the flat surfaces of the cotyledons was >5 mm, 3-5mm, 1-3mm or less than 1 mm, respectively.

[‡] e and f indicates that the length of the necrotic zone on the flat surfaces of the cotyledon near the hypocotyl was >1 mm or <1 mm, respectively.